



Benefits in the Consideration of Structural Insulated Panels for the California 2005 Energy Efficiency Standards Update

In response to the CEC request, here enclosed is the following brief to consider the use of Structural Insulated Panels (S.I.P.S.) to be considered as a viable update to the California 2005 Energy Code Update.

MEASUREMENT INFORMATION TEMPLATE

2005 Energy Efficiency Update Revisions for 2003 Adoption

Description

This proposed measure would allow for the use of whole wall values to be considered as a combination of R-values as well as infiltration and exfiltration benefits by the use of Structural Insulated Panels when used in wall, floor and roof framing systems. Specifically, the use of Structural Insulated Panels, when used as a framing system are currently valued at present as a cumulative effect of R-Value only and do not take into consideration the tightness of the building envelope due to its systemized approach to construction. Performance Standards are currently being evaluated by both H.U.D. and A.S.T.M. and is being funded by H.U.D. and S.I.P.A. the Structural Insulated Panel Association. Publication is expected in Fall 2002.

Benefits

While Structural Insulated Panels are not currently the mainstay of construction building systems, they exhibit an overall better performance when compared to wood or steel framing systems, due to higher R-Values and standardized components, as well as reducing infiltration and exfiltration losses in buildings. SIP buildings continually demonstrate the ability to downsize HVAC systems and eliminate the frequency of HVAC system use. Standard practices for using SIPS call for a construction methodology that systematically reduces infiltration and exfiltration losses through adopted construction techniques and are practiced throughout the United States through BOCA, SBCII, and ICBO code agencies. The average energy bill for a SIP built homes is 50% less than stick framed equivalents.

Environmental Impact

Structural Insulated Panels are comprised of wood products grown from harvested and renewable forest resources. Foam cores for SIPS currently allowed for in California are comprised from EPS (expanded polystyrene), a by product of refining petroleum products. EPS is expanded and molded with steam. EPS is a recyclable product.

Type of Change

Mandatory Measure not affected.

Prescriptive Requirement not affected

Compliance Option

We propose that infiltration and the airtight characteristics exhibited in SIP construction methods, as well as the whole wall R-Value of buildings constructed with SIPS be allowed for in the computer programs that detail energy usage, namely Micropas. We would like SIPS to be recognized for these higher R-Values and lower infiltration values, and allow for the recognition of their building envelope efficiencies. This would still be accomplished via the compliance method.

Modeling

We endorse the current report "Characterization of Framing Factors for Low-Rise Residential Building Envelopes in California, draft final report, dated November 2001, and would like to use this report as a model and comparison in which to gauge energy performance.

This proposed change would allow for infiltration and exfiltration values to be incorporated within Title 24 California Energy Codes.

Measure Availability and Cost

California has three major SIP manufactures that have undertaken California Title 25 Compliance and maintain ICBO code recognition. Premier Building Systems in Phoenix, AZ, Advanced Foam Plastics in Sparks, NV, and Precision Panel in Idaho.

All are ICBO approved building systems and endorsed by Energy Star, HUD, NAHB, and DOE. There are more than 30 other manufactures that also supply SIPS as a building material and also have ICBO, BOCA, and SBCII code approval and only await Title 25 endorsement from California. Most are members of S.I.P.A. the Structural Insulated Panel Association, a national force that is dedicated to the use and implementation of SIPS as a building material system.

Competing products are mainly steel and stick frame construction.

In today's market, SIPS are slightly higher in cost as a building material. Due to a systemized approach to construction, they have the ability to save as much as 60% in labor costs. There is no fiscal impact on implementing and allowing for SIP building envelope efficiency. Indoor environments are easily maintained and require mechanical heat recovery ventilation to insure indoor air quality and manufactures warranties.

Useful Life, Persistence, and Maintenance

Most manufactures warrant their products for the lifetime of the structure. EPS foam cores do not degrade and are guaranteed to maintain R-Value for 20 years. All SIP systems need to be engineered to meet individual building structural analysis. Energy savings, lower cost of HVAC equipment and operating costs, and overall comfort are instantly achieved. Maintenance of a SIP home is no different than that of any conventional stick framed home.

Performance Verification

At present all major manufactures of SIPS have documentation, training videos, schools, architectural details, and design help and engineering to insure proper installation of SIP. All buildings should be reviewed by a structural engineer. Proper design and implementation of structural components are approved by code agencies.

Analysis Tools

The computer is the basic energy tool to use in determining the effectiveness in a SIP structure. Compliance with Energy Star programs would determine definitively the tightness of a structure with a blower door test. Infrared Cameras also could be used to determine how well the SIPS are working on a case-by-case basis.

Relationship to Other Measures

In addition to annual energy savings, SIPS have proven peak reduction benefits, allowing for the down-sizing of HVAC equipment. We encourage the Commission to recognize the particular energy saving benefits provided by SIP building systems in Title-24. Such recognition is also key to our long-term goal of having SIPS properly addressed in all major energy codes.

Bibliography

Oak Ridge National Laboratory Whole Wall Study and Analysis
ICBO, BOCA, SBCII reports for numerous manufactures as well as Sandwich Panel Criteria.

AFM R-Control
Premier Building Systems
Insulspan Structural Insulated Panels
Precision Panels
APA-Engineered Wood Association
Energy Star
D.O.E.
P.A.T.H
Structural Insulated Panel Association